

1 This listing of claims will replace all prior versions, and listings, of claims in the application:

2 **Listing of Claims:**

3 1. (original) A fluid control and processing system comprising:
4 a housing having a plurality of chambers; and
5 a valve body including a first fluid processing region continuously coupled
6 fluidically with a fluid displacement region, the fluid displacement region being
7 depressurizable to draw fluid into the fluid displacement region and pressurizable to expel
8 fluid from the fluid displacement region, the valve body including a plurality of external
9 ports, the first fluid processing region being fluidically coupled with at least two of the external
10 ports, the fluid displacement region being fluidically coupled with at least one of the external
11 ports of the valve body, and the valve body being adjustable with respect to the housing to
12 allow the external ports to be placed selectively in fluidic communication with the plurality
13 of chambers,

14 wherein at least one of the plurality of chambers is a processing chamber, the
15 processing chamber including a first port and a second port for selectively communicating
16 with at least one of the external ports of the valve body, the processing chamber providing an
17 additional fluid processing region.

18 2. (original) The system of claim 1 wherein at least one of the fluid
19 processing regions in the valve body or in the processing chamber contains a fluid processing
20 material which is an enrichment material or a depletion material.

21 3. (original) The system of claim 2 wherein the fluid processing material
22 comprises at least one solid phase material.

23 4. (original) The system of claim 3 wherein the solid phase material
24 comprises at least one of beads, fibers, membranes, filter paper, glass wool, polymers, and
25 gels.

26 5. (original) The system of claim 3 wherein the fluid processing material
27 comprises a filter and beads.

28 6. (original) The system of claim 3 wherein the fluid processing material
29 comprises at least two types of beads.

30 7. (original) The system of claim 6 wherein the at least two types of
31 beads perform at least two different functions which are selected from the group consisting of
32 cell capture, cell lysis, binding of analyte, and binding of unwanted material.

33 8. (original) The system of claim 1 wherein at least one of the fluid
34 processing regions contains a solid phase material which performs at least two different
35 functions selected from the group consisting of cell capture, cell lysis, binding of analyte, and
36 binding of unwanted material.

37 9. (original) The system of claim 2 wherein the fluid processing material
38 comprises at least one liquid phase material.

39 10. (original) The system of claim 9 wherein the liquid phase material
40 comprises at least one of ficoll, dextran, polyethylene glycol, and sucrose.

41 11. (original) The system of claim 2 wherein the fluid processing material
42 is contained in the fluid processing region by one or more frits.

43 12. (original) The system of claim 1 wherein the external ports are
44 disposed on a generally planar external port surface of the valve body, and wherein the valve
45 body is rotatable around an axis and relative to the plurality of chambers to allow the external
46 ports to be placed selectively in fluidic communication with the plurality of chambers, the
47 axis being perpendicular to the external port surface, and the external ports being spaced
48 from the axis by a common radius.

49 13. (original) The system of claim 1 wherein at least one of the fluid
50 processing regions contains one type of beads which perform at least two different functions

51 selected from the group consisting of cell capture, cell lysis, binding of analyte, and binding
52 of unwanted material.

53 14. (original) The system of claim 1 wherein the processing chamber
54 includes a receiving area for receiving a processing module containing an enrichment
55 material or a depletion material.

56 15. (original) The system of claim 14 wherein the processing chamber
57 further includes a collection area for receiving fluid that has flowed through the processing
58 module, and wherein the processing module includes means for retaining the enrichment or
59 depletion material in the processing module and a spout for directing the fluid into the
60 collection area.

61 16. (original) The system of claim 1 wherein at least one of the chambers
62 is a reagent chamber containing dried or lyophilized reagents.

63 17. (canceled)

64 18. (canceled)

65 19. (canceled)

66 20. (canceled)

67 21. (canceled)

68 22. (canceled)

69 23. (canceled)

70 24. (canceled)

71 25. (canceled)

72 26. (original) A fluid control and processing system comprising:
73 a housing having a plurality of chambers; and
74 a valve body including a fluid processing region continuously coupled
75 fluidically with a fluid displacement region, the fluid displacement region being
76 depressurizable to draw fluid into the fluid displacement region and pressurizable to expel
77 fluid from the fluid displacement region, the valve body including an external port, the fluid

78 processing region being fluidically coupled with the external port, the fluid displacement
79 region being fluidically coupled with the external port of the valve body, and the valve body
80 being adjustable with respect to the housing to allow the external port to be placed selectively
81 in fluidic communication with the plurality of chambers.

82 27. (original) The system of claim 26 wherein the valve body is adjustable
83 with respect to the housing to close the external port so that the fluid displacement region and
84 the fluid processing region are fluidically isolated from the chambers.

85 28. (original) The system of claim 26 wherein at least one of the chambers
86 or the fluid processing region contains an enrichment material or a depletion material.

87 29. (original) The system of claim 28 wherein the enrichment or depletion
88 material perform a function which is selected from the group consisting of cell capture, cell
89 lysis, binding of analyte, and binding of unwanted material.

90 30. (original) The system of claim 26 wherein at least one of the chambers
91 is a processing chamber having inlet and outlet ports for selectively communicating with the
92 external port of the valve body.

93 31. (original) The system of claim 30 wherein the processing chamber
94 includes a receiving area for receiving a processing module containing an enrichment
95 material or a depletion material.

96 32. (original) The system of claim 31 wherein the processing chamber
97 further includes a collection area for receiving fluid that has flowed through the processing
98 module, and wherein the processing module includes means for retaining the enrichment or
99 depletion material in the processing module and a spout for directing the fluid into the
100 collection area.

101 33. (original) The system of claim 26 wherein at least one of the chambers
102 is a reagent chamber containing dried or lyophilized reagents.

103 34. (original) The system of claim 26 wherein the fluid displacement
104 region is depressurizable by increasing in volume and is pressurizable by decreasing in
105 volume.

106 35. (original) The system of claim 34 further comprising a fluid
107 displacement member disposed in the fluid displacement region, the fluid displacement
108 member being movable to adjust the volume of the fluid displacement region.

109 36. (original) The system of claim 35 wherein the fluid displacement
110 member comprises a piston movable in a linear direction in the fluid displacement region.

111 37. (original) The system of claim 36 wherein the fluid displacement
112 member comprises a piston shaft which is connected to a distal portion of a piston rod for
113 driving the piston shaft to move inside the fluid displacement region, the piston shaft being
114 smaller in cross-section than the piston rod.

115 38. (original) The system of claim 26 further comprising an energy
116 transmitting member operatively coupled with the fluid processing region for transmitting
117 energy thereto to process fluid contained therein.

118 39. (original) The system of claim 38 further comprising a cover disposed
119 between the fluid processing region and the energy transmitting member.

120 40. (original) The system of claim 39 wherein the cover comprises a rigid
121 shell.

122 41. (original) The system of claim 39 wherein the energy transmitting
123 member comprises an ultrasonic member for transmitting ultrasonic energy through the cover
124 into the fluid processing region.

125 42. (original) The system of claim 26 wherein the valve body includes a
126 crossover channel, the valve body being adjustable with respect to the housing to place the
127 crossover channel in fluidic communication with an aspiration chamber and a source

128 chamber to permit aspiration of a fluid from the source chamber through the crossover
129 channel to the aspiration chamber.

130 43. (original) The system of claim 42 wherein the body is rotatably
131 adjustable around an axis, and wherein the at least one external port is disposed within a
132 range of external port radii from the axis and the crossover channel is disposed within a range
133 of crossover channel radii from the axis, the range of external port radii and the range of
134 crossover channel radii being non-overlapping.

135 44. (original) The system of claim 43 wherein the crossover channel is a
136 circular arc lying on a common crossover channel radius from the axis.

137 45. (original) The system of claim 26 wherein at least two of the plurality
138 of chambers are separated by a flexible wall to permit change-over of chamber volumes
139 between the chambers.

140 46. (original) A fluid control and processing system for controlling fluid
141 flow among a plurality of chambers, the system comprising:
142 a body including a fluid processing region continuously coupled fluidically with
143 a fluid displacement region, the fluid displacement region being depressurizable to draw fluid
144 into the fluid displacement region and pressurizable to expel fluid from the fluid
145 displacement region, the body including at least one external port, the fluid processing region
146 being fluidically coupled with the at least one external port, the fluid displacement region
147 being fluidically coupled with at least one external port of the valve body, and the body being
148 rotatably adjustable relative to the plurality of chambers to place the at least one external port
149 selectively in fluidic communication with the plurality of chambers.

150 47. (original) The system of claim 46 wherein at least one of the chambers
151 or the fluid processing region contains an enrichment material or a depletion material.

152 48. (original) The system of claim 46 wherein at least one of the chambers
153 is a reagent chamber containing dried or lyophilized reagents.